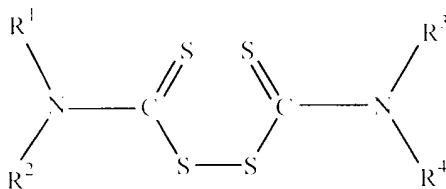


REMARKS

Claims 1-7, 10-19 and 22-24 are pending in this application.

The Examiner has rejected Claims 1-7, 11-19 and 24 under 35 U.S.C. §103(a) as being obvious over EP 479,526 ("EP '479") in view of Materne et al. U.S. Patent No. 6,273,163 B1 ("Materne").

As pointed out by the Examiner in the Office Action, nowhere does EP '479 disclose or suggest a rubber composition obtained from (a) a rubber component, (b) a silica filler and (c) "a thiuram disulfide of the general formula



wherein R^1 , R^2 , R^3 and R^4 each are the same or different and are hydrocarbons of between 8 and 18 carbon atoms, it being provided that diphenyl guanidine is substantially absent in the rubber composition" as presently recited in amended Claim 1. Nor, for that matter, does EP '479 disclose or suggest a method for increasing the mooney scorch value of a rubber composition by employing the specifically recited thiuram disulfide wherein diphenyl guanidine is substantially absent in the rubber composition together with a rubber component and a silica filler as generally recited in amended Claim 16.

Rather, EP '479 discloses rubber compositions containing a rubber component, sulfur, carbon black filler and an accelerator such as tetra-2-ethylhexyl thiuram disulfide, diphenyl guanidine and di-2-ethylhexyl dithiocarbamic acid antimoate. At no point is there any

appreciation in EP '479 of employing the specifically recited thiuram disulfide of Claims 1 and 16 where the R¹, R², R³ and R⁴ substituents are the same or different and are hydrocarbons of between 8 and 18 carbon atoms in a rubber composition containing a rubber component and a silica filler with diphenyl guanidine being substantially absent in the rubber composition. Nor, for that matter, is there any appreciation in EP '479 that the mooney scorch value of a rubber composition can be increased by employing the specifically recited thiuram disulfide with diphenyl guanidine being substantially absent in a rubber composition containing a rubber component and a silica filler. Thus, one skilled in the art would not be motivated by EP '479 to modify the rubber composition disclosed therein to arrive at the presently claimed rubber composition of Claims 1 and 16 with any expectation of success.

Materne does not cure the deficiencies of EP '479. Specifically, Materne nowhere provides any disclosure, suggestion, or even a hint that employing the specifically recited thiuram disulfide of Claims 1 and 16 where the R¹, R², R³ and R⁴ substituents are "the same or different and are hydrocarbons of between 8 and 18 carbon atoms" in a rubber composition with diphenyl guanidine being substantially absent therefrom together with a rubber component and a silica filler increases the mooney scorch value of the resulting rubber composition without sacrificing other physical properties such as the tangent delta value.

Rather, Materne discloses rubber compositions containing starch/plasticizer composite reinforcing fillers together with (a) a rubber component; (b) a reinforcement filler and (c) vulcanization accelerators such as benzothiazole, alkyl thiuram disulfide, guanidine derivatives and thiocarbamates. Materne further discloses species within each of the genus

accelerators of which is disclosed tetramethyl thiuram disulfide as the alkyl thiuram disulfide and diphenyl guanidine as the guanidine derivative. At no point is there any appreciation in Materne of employing the specifically recited thiuram disulfide of Claims 1 and 16 where the R¹, R², R³ and R⁴ substituents (as shown in the claimed compound) are "the same or different and are hydrocarbons of between 8 and 18 carbon atoms" in a rubber composition with a rubber component and a silica filler wherein diphenyl guanidine is substantially absent in the rubber composition or, for that matter, that the mooney scorch value of a rubber composition containing a rubber component and a silica filler can be increased by employing the specifically recited thiuram disulfide with diphenyl guanidine being substantially absent in the rubber composition. Thus, nothing in Materne would lead one skilled in the art to modify the rubber composition of EP '479 with the disclosure of Materne and arrive at the presently claimed rubber composition with any expectation of success.

In order to meet his burden of a *prima facie* obviousness rejection, the Examiner alleges that "[i]t would have been obvious to one of ordinary skill in the art to have either substituted silica fillers for the carbon black fillers of EP or to have included silica fillers in the addition to carbon black in the rubber composition of EP because the substitution of art recognized equivalents is prima-facie obvious and because it is prima facie obvious to combine two components each of which is taught by the prior art to be useful for the same purpose, in order to form a third component to be used for the very same purpose. *In re Kerkhoven*, 205 USPQ 1069 (CCPA 1980). Furthermore, Materne teaches that silica fillers could be used in combination with carbon black."

This wholly unsupported allegation cannot possibly serve as a basis for this rejection. It is well recognized to one skilled in the art of chemistry that carbon black and silica are vastly different compounds and not at all equivalents. For example, carbon black and silica provide different curing rates when used in rubber compositions leading to different processing conditions when forming the rubber composition. Accordingly, one skilled in the art would have no reasonable expectation of success that a rubber composition containing a rubber component, a silica filler and the specifically recited thiuram disulfide wherein diphenyl guanidine is substantially absent from the rubber composition would have improved performance characteristics, including a higher mooney scorch value. As stated above, EP '479 merely discloses rubber compositions containing, *inter alia*, a rubber component, carbon black filler and an accelerator such as tetra-2-ethylhexyl thiuram disulfide, diphenyl guanidine and di-2-ethylhexyl dithiocarbamic antimoate. Materne, on the other hand, merely discloses rubber compositions containing a rubber component, silica and/or carbon black fillers and vulcanization accelerators such as alkyl thiuram disulfides such as tetramethyl thiuram disulfide and guanidine derivatives. Thus, at no point is there any appreciation in EP '479 or Materne or their combination of employing the specifically recited thiuram disulfide of Claims 1 and 16 where the R¹, R², R³ and R⁴ substituents are the same or different and are hydrocarbons of between 8 and 18 carbon atoms in a rubber composition containing a rubber component and a silica filler with diphenyl guanidine being substantially absent in the rubber composition such that the resulting rubber composition has improved performance characteristics. Accordingly, it is submitted that

the Examiner has not made out a case of *prima facie* obviousness in rejecting Claims 1-7, 10-19 and 22-24 over Materne in view of EP '479.

Despite the fact that no *prima facie* case of obviousness exists, the Examiner fails to appreciate the enhanced effects obtained in employing the specifically recited thiuram disulfide where the R¹, R², R³ and R⁴ substituents are the same or different and are hydrocarbons of between 8 and 18 carbon atoms in a rubber composition with diphenyl guanidine being substantially absent therefrom together with a rubber component and a silica filler in the presently claimed rubber composition. Applicants have surprisingly discovered that rubber compositions containing a combination of a rubber component, a silica filler and the specifically recited thiuram disulfide wherein diphenyl guanidine is substantially absent in the rubber composition have improved performance characteristics, including a significantly higher mooney scorch value, when compared to rubber compositions containing thiuram disulfides wherein the R¹, R², R³ and R⁴ substituents have less than 8 carbon atoms and to rubber compositions containing diphenyl guanidine. This is illustrated in applicants' examples set forth in the specification which shows that by using a tetraalkyl (C₁₂-C₁₄) thiuram disulfide, instead of diphenyl guanidine, results in a rubber composition having a significantly improved mooney scorch value without any sacrifice in physical properties over a rubber composition containing diphenyl guanidine.

As shown in Table IV of applicants' specification, when comparing applicants' Examples 1-2 employing a rubber composition containing a thiuram disulfide where the R¹, R², R³ and R⁴ substituents are the same or different and are hydrocarbons of between 8 and 18 carbon

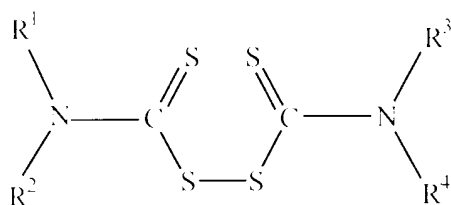
atoms (within the scope of the invention) with Examples 3 and 4 which employ a rubber composition containing a thiuram disulfide where the R¹, R², R³ and R⁴ substituents contain 6 carbon atoms (outside the scope of this invention) and Comparative Example A employing a rubber composition containing diphenyl guanidine ("DPG") (outside the scope of this invention). Each of the rubber compositions of Examples 1 and 2 provided an improved mooney scorch value. For example, when comparing the rubber composition of Example 2 to the rubber compositions of Example 4 and Comparative Example A, the rubber composition of Example 2 possessed a mooney scorch value (3 pt. rise time) of 13 while the rubber compositions of Example 4 and Comparative Example A possessed a mooney scorch value of 12 and 10, respectively. It is also noteworthy that the cure times of the rubber compositions were relatively the same by replacing 1 phr DPG with 0.25 phr of the presently recited thiuram disulfide for Example 2. This is highly advantageous in that better processing of the rubber compositions can be achieved without sacrificing other physical properties while also obtaining an economical advantage by utilizing significantly less thiuram disulfide compared to DPG. Accordingly, Applicants' examples clearly establish that replacing diphenyl guanidine with a tetraalkyl (C₈-C₁₈) thiuram disulfide in a rubber composition containing a rubber component and a silica filler results in a significantly improved scorch safety without any sacrifice in physical properties of the rubber composition. Nothing in EP '479 or Materne would lead one skilled in the art to expect these superior results.

Since EP '479, alone or in combination with Materne, fails to disclose or suggest a rubber composition containing a rubber component, a silica filler and a thiuram disulfide wherein R¹, R², R³ and R⁴ of the thiuram disulfide are the same or different and are hydrocarbons

containing from about 8 to about 18 carbon atoms with diphenyl guanidine being substantially absent in the rubber composition. Claims 1-7, 11-19 and 24 are believed to be nonobvious, and therefore patentable, over EP '479 and Materne. In view of the foregoing, withdrawal of the rejection under 35 U.S.C. §103(a) is warranted and such is respectfully requested.

The Examiner has rejected Claims 1-7, 10-19 and 22-24 under 35 U.S.C. §103(a) as being obvious over Usamoto et al. U.S. Patent No. 3,852,354 ("Usamoto") in view of Materne.

As pointed out by the Examiner, nowhere does Usamoto disclose or suggest a rubber composition obtained from (a) a rubber component, (b) a silica filler and (c) "a thiuram disulfide of the general formula



wherein R¹, R², R³ and R⁴ each are the same or different and are hydrocarbons of between 8 and 18 carbon atoms, it being provided that diphenyl guanidine is substantially absent in the rubber composition" as presently recited in amended Claim 1. Nor, for that matter, does Usamoto disclose or suggest a method for increasing the mooney scorch value of a rubber composition by employing the specifically recited thiuram disulfide wherein diphenyl guanidine is substantially absent in the rubber composition together with a rubber component and a silica filler as generally recited in amended Claim 16.

Rather, Usamoto discloses co-vulcanizable compositions containing a blend of EPDM rubber and a highly unsaturated rubber, carbon black and accelerators such as higher alkyl

thiuram disulfides, e.g., tetralauryl thiuram disulfide, and/or benzothiazylsulfonamides. Usamoto further discloses that the solubilities in highly unsaturated rubbers can be increased by the addition of the accelerators. However, at no point is there any appreciation in Usamoto that employing the specifically recited thiuram disulfide of Claim 1 where the R^1 , R^2 , R^3 and R^4 substituents are the same or different and are hydrocarbons of between 8 and 18 carbon atoms in a rubber composition containing a rubber component and a silica filler with diphenyl guanidine being substantially absent in the rubber composition increases the mooney scorch value of the resulting rubber composition without sacrificing other physical properties such as the tangent delta value.

Materne does not cure the deficiencies of Usamoto. Specifically, Materne likewise nowhere provides any disclosure, suggestion, or even a hint that employing the specifically recited thiuram disulfide of Claims 1 and 16 where the R^1 , R^2 , R^3 and R^4 substituents are "the same or different and are hydrocarbons of between 8 and 18 carbon atoms" in a rubber composition with diphenyl guanidine being substantially absent therefrom together with a rubber component and a silica filler increases the mooney scorch value of the resulting rubber composition without sacrificing other physical properties such as the tangent delta value.

Rather, Materne discloses rubber compositions containing starch/plasticizer composite reinforcing fillers together with (a) a rubber component; (b) a reinforcement filler and (c) vulcanization accelerators such as benzothiazole, alkyl thiuram disulfide, guanidine derivatives and thiocarbamates. Materne further discloses species within each of the genus accelerators of which is disclosed tetramethyl thiuram disulfide as the alkyl thiuram disulfide and diphenyl guanidine as the guanidine derivative. At no point is there any appreciation in Materne

of employing the specifically recited thiuram disulfide of Claims 1 and 16 where the R¹, R², R³ and R⁴ substituents (as shown in the claimed compound) are "the same or different and are hydrocarbons of between 8 and 18 carbon atoms" in a rubber composition with a rubber component and a silica filler wherein diphenyl guanidine is substantially absent in the rubber composition. Nor is there any appreciation in Materne that the mooney scorch value of a rubber composition containing a rubber component and a silica filler can be increased by employing the specifically recited thiuram disulfide with diphenyl guanidine being substantially absent in the rubber composition. Thus, nothing in Materne would lead one skilled in the art to modify the rubber composition of Usamoto with the disclosure of Materne and arrive at the presently claimed rubber composition having an increased mooney scorch value with any expectation of success.

In order to meet his burden of a *prima facie* obviousness rejection, the Examiner first alleges that "[i]n the first aspect, Usamoto differs from the claims in that he fails to teach the method for increasing the Mooney Scorch value of the rubber composition. However, no unobviousness is seen in this difference because Usamoto teaches a rubber composition that does not contain diphenyl guanidine. Therefore, it would be reasonable to expect that the Mooney Scorch value of the rubber composition would increase in the absence of diphenyl guanidine."

This wholly unsupported allegation cannot possibly serve as a basis for this rejection. If it is the Examiner's position that one of ordinary skill in the art, upon inspection of Usamoto, would be motivated to increase the mooney scorch value by forming the specifically recited rubber composition, then the Examiner is respectfully requested to explain with reasons of particularity why one skilled in the art would be motivated to increase the mooney scorch

value by forming a rubber composition containing a rubber component and a silica filler together with the specifically recited thiuram disulfide of Claim 16 where the R¹, R², R³ and R⁴ substituents are the same or different and are hydrocarbons of between 8 and 18 carbon atoms with diphenyl guanidine being substantially absent in the rubber composition. Besides, at no point in Usamoto, Materne or their combination is there any appreciation that the mooney scorch value can be increased by forming a rubber composition containing a rubber component and a silica filler together with the specifically recited thiuram disulfide of Claim 16 where the R¹, R², R³ and R⁴ substituents are the same or different and are hydrocarbons of between 8 and 18 carbon atoms with diphenyl guanidine being substantially absent in the rubber composition. Instead, Usamoto merely teaches that the solubilities in highly unsaturated rubbers can be increased by the addition of the accelerators for rubber compositions co-vulcanizable compositions containing a blend of EPDM rubber and a highly unsaturated rubber and carbon black. Materne simply discloses the preparation of rubber compositions containing starch/plasticizer composite reinforcing fillers together with a rubber component: a reinforcement filler and vulcanization accelerators such as benzothiazole, alkyl thiuram disulfide, guanidine derivatives. Accordingly, nothing in Materne would lead one skilled in the art to modify the Usamoto reference and arrive at the claimed method for increasing the mooney scorch value by forming the specifically recited rubber composition. Thus, it is believed that Claims 16-19 and 22-24 are nonobvious over Usamoto in view of Materne.

The Examiner further sets forth in the Office Action that "[i]n the second aspect, Usamoto fails to teach the addition of silica filler. However, Materne teaches this difference. ... It would have been obvious to one of ordinary skill in the art to have either substituted silica

fillers for the carbon black fillers of Usamoto or to have included silica fillers in the addition to carbon black in the rubber composition of Usamoto because the substitution of art recognized equivalents is prima-facie obvious and because it is prima facie obvious to combine two components each of which is taught by the prior art to be useful for the same purpose, in order to form a third component to be used for the very same purpose. *In re Kerkhoven*, 205 USPQ 1069 (CCPA 1980). Furthermore, Materne teaches that silica fillers could be used in combination with carbon black."

This wholly unsupported allegation cannot possibly serve as a basis for this rejection. As stated above, it is well recognized to one skilled in the art of chemistry that carbon black and silica are vastly different compounds and not at all equivalents. For example, carbon black and silica provide different curing rates when used in rubber compositions leading to different processing conditions when forming the rubber composition. Accordingly, one skilled in the art would have no reasonable expectation of success that a rubber composition containing a rubber component, a silica filler and the specifically recited thiuram disulfide wherein diphenyl guanidine is substantially absent from the rubber composition would have improved performance characteristics, including a higher mooney scorch value without sacrificing other physical properties such as the tangent delta value. Accordingly, it is believed that Claims 1-7 and 10-15 are nonobvious over Usamoto in view of Materne*479.

Since Usamoto, alone or in combination with Materne, fails to disclose or suggest a rubber composition containing a rubber component, a silica filler and a thiuram disulfide wherein R^1 , R^2 , R^3 and R^4 of the thiuram disulfide are the same or different and are hydrocarbons containing from about 8 to about 18 carbon atoms with diphenyl guanidine being substantially

absent in the rubber composition and method for increasing the mooney scorch value by forming the specifically recited rubber composition. Claims 1-7, 10-19 and 22-24 are believed to be nonobvious, and therefore patentably, over Usamoto and Materne. In view of the foregoing, withdrawal of the rejection under 35 U.S.C. §103(a) is warranted and such is respectfully requested.

For the foregoing reasons, it is submitted that Claims 1-7, 10-19 and 22-24 as presented herein are believed to be in condition for immediate allowance. Such early and favorable action is earnestly solicited.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Michael E. Carmen".

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